ADDITIONAL NOTES ON THE GENUS *VITEX*. XXXV

Harold N. Moldenke

VITEX TRIFLORA var. *HIRSUTA* Mold.

Additional bibliography: Mold., Phytologia 51: 290. 1982.

Schunke Vigo describes this plant as a tree, 4--5 m. tall, the leaves bright yellow-green, with prominent venation, and encountered it in high shady forest at 800 m. altitude.

Additional citations: PERU: Loreto: *Schunke Vigo 5392* (Ld, N). San Martín: *Schunke Vigo 7494* (Ld). BRAZIL: Acre: *Maas, Kubitzki, Steward, Ramos, Pinheiro, & Lima P.13120* (Ld--type, N--isotype).

VITEX TRIFLORA var. *KRAATZII* Huber

Additional bibliography: Mold., Phytologia 17: 47. 1968; Mold., Fifth Summ. 1: 180 (1971) and 2: 717, 729, & 930. 1971; Mold., Phytol. Mem. 2: 172 & 595. 1980; Mold., Phytologia 51: 289. 1982.

Recent collectors describe this plant as a shrub, 2 m. tall, or a tree, 4 m. tall, the [flower] buds green, and have encountered it in capoeira on terra firme and in secondary varzea forests, in flower in October and December, and in fruit in December. The corollas are said to have been "lilac" in color on *Silva & al. AS. 84* and "greenish" on *Albuquerque Lobo & al. 19* and *Nascimento 484*.

Additional citations: BRAZIL: Pará: *Albuquerque Lobo, Vilhena, & Ribeiro 19* (N); *Nascimento 484* (N), *848* (N); *Silva, Berg, Nelson, Henderson, Bahia, & Reis dos Santos AS.84* (N).

VITEX TRIFLORA var. *QUINQUEFOLIOLATA* Mold.

Additional bibliography: Mold., Phytologia 17: 47. 1968; Mold., Fifth Summ. 1: 137, 144, & 180 (1971) and 2: 729 & 930. 1971; Soukup, Biota 11: 20. 1976; López-Palacios, Revist. Fac. Farm. Univ. Andes 20: 34. 1979; Mold., Phytologia 44: 384. 1979; Mold., Phytol. Mem. 2: 130, 136, 172, 460, & 595. 1980; Mold., Phytologia 51: 288. 1982.

VITEX TRIFOLIA L.

Additional & emended synonymy: *Vitex trifolia minor, indica* Breyn, Prod. Fasc. Rar. Pl., ed. 1, 2: 105--106. 1688. *Vitex trifolia indica, odora, hortensis, floribus caeruleis racemosis* P. Herm. ex Breyn, Prod. Fasc. Rar. Pl., ed. 1, 2: 106, in syn. 1688. *Vitex trifolia indica odora hortensis floribus caeruleis racemosis. Nochile Lagondi. Malaice Jasminum indicum cyneum odore gravi Syringae caeruleae facie* P. Herm., Mus. Zeyl., ed. 1, 48. 1717. *Vitex trifolia, floribus per ramos sparsis* Burm., Thes. Zeyl. 229. 1737. *Piperi similis fructus striatus faemina* Bauh. ex L., Fl. Zeyl. 194, in syn. 1747. *Cara-nosi* Rheede ex L., Fl. Zeyl. 194, in syn. 1747. *Vitex trifolia indica odorata hortensis, floribus caeruleis racemosis* Burm. ex L., Fl. Zeyl. 194. 1747. *Frutex indicus baccifer, fructu calyculato monopyreno* Ray ex L., Fl. Zeyl. 194, in syn. 1747. *Nika* Herm. ex L., Fl. Zeyl. 194 in syn. 1747.

Vitex foliis ternatis quinatisve, paniculis dichotomis L., Sp. Pl., ed. 1, imp. 1, 2: 638. 1753. *Piperi similis, fructus striatus, femina* Bauh. ex L., Sp. Pl., ed. 1, imp. 1, 2: 638, in syn. 1753. *Vitex foliis ternatis quinatisve integerrimis, panicula dichotomis* L. ex N. L. Burm., Fl. Ind. Orient. 137. 1968. *Vitex trifolia* Lam. ex Desf., Tabl. Écol. Bot., ed. 1, 53. 1804. *Vitex trifoliata* Roxb., Hort. Beng., imp. 1, 46. 1814. *Vitex trifoliata* L. ex Blume, Bijdr. Fl. Ned. Ind. 14: 812. 1826. *Vitex trifolia* Willd. ex Roxb., Fl. Ind., ed. 2, imp. 1, 3: 69. 1832. *Vitex trifolia* α *trifoliata* Cham., Linnaea 7: 107. 1832. *Cazanosi* Rheede apud Decne., Nouv. Ann. Mus. Hist. Nat. Paris 3:400--401, in syn. 1834. *Vitex trifoliata* L. apud Decne., Nouv. Ann. Mus. Hist. Nat. Paris 3: 400. 1834. *Vitex trifolia* α *trifoliolata* Schau. in A. DC., Prodr. 11: 683. 1847. *Vitex trifolia &c.* Pluk. ex Buek, Gen. Spec. Syn. Candoll. 3: 502 in syn. 1858. *Vitex agnus castus* var. *trifolia* Kurz, Forest Fl. Brit. Burma 2: 270. 1877. *Vitex agnus castus* var. Kurz ex C. B. Clarke in Hook. f., Fl. Brit. India 4: 583, in syn. 1885. *Vitex agnus-castus* var. *trifolia* Kurz ex Fletcher, Kew Bull. Misc. Inf. 1938: 432. 1938. *Vitex trifolia* var. *trifoliolata* Schau. ex Mold., Prelim. Alph. List Inv. Names 52, in syn. 1940. *Vitex negundo* (non L.) Matsum. ex Matsumune, Sci. Rep. Kanazawa Univ. 4: 49, in syn. 1955. *Vitex trifolia* var. *trifoliata* Cham. apud Mold., Phytologia 6: 165, in syn. 1958. *Vitex trifolia floribus per ramos sparsis* Burm. apud Mold., Phytologia 6: 165, in syn. 1958. *Vitex lagundi* Farnsworth, Pharmacog. Titles 8 (7): xii. 1973. *Vitex trifolia* ssp. *trifolia* Steen. ex Mold., Phytol. Mem. 2: 460, in syn. 1980.

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imp. 3, 3: pl. 740B. 1975.

In reference to illustrations of this species in botanical literature, Trimen (1895) states that "The foliage is pleasantly aromatic. There is no specimen or drawing [of it] in Herman's Herb., and the figure in Burm. Thes. t. 109, referred to this by Willdenow is certainly not a *Vitex* at all."

Recent collectors describe *Vitex trifolia* as a coppice-growing tree, 12--15 m. tall, a shrubby tree or shrub, 0.5--4 m. tall, the sap colorless, the leaves dry, dull-green, the flowers aromatic, the "petals recurved", and the fruit globular. They have encountered it in sandy clay soil and sandy volcanic soil, on riverbanks and beaches, and, according to Sauer (in Mauritius), at the outer edges of *Casuarina* plantations in back of wide sand beaches at river mouths, from sealevel to 1500 m. altitude. Puri (1960) found it growing with *V. negundo* in moist, edaphic, mangrove forests in the Sunderbans of Bengal. Davidse found it "on benches among coconuts just back of the *Spinifex* zone". Collectors have found it in full anthesis from April to August and from October to December, as well as in February, and in fruit in February, May, June, August, November, and December.

Datta & Majumder (1966) assert that in Bengal it flowers from March to May. Backer (1931) says that it blooms all through the year in Java, and Patel (1971) says the same thing. Cooke (1905) and Talbot assert that in India it blooms "more or less throughout the year", but Patel (1968) gives the time of anthesis as only June to December. Trimen (1895) reports it flowering in Sri Lanka in August and September and growing there in "low country, generally near the seacoast; rather common, especially in the dry region." Comanor refers to it as a "common shrub" there, while Thwaites & Hooker (1861) describe it as "not uncommon near the sea".

Sauer reports it "dominant instead of *Scaevola* on a small sector of beach ridge [on Mahe in the Seychelles], but 2 weeks later mostly killed back apparently by spray with SE wind and huge tides." He found it in flower and fruit there in May.

Schumann (1898) says of this species: "In Süd- und Ost-Asien weit verbreitet". Tanner found it rooting in permanent water in Tanzania. Fosberg reports it "common on low berms of coral sand and gravel rock on low beach ridges covered by unevenly closed scrub forest" in Sri Lanka.

Cooke (1905) truly remarks that *V. trifolia* is very closely allied to *V. negundo*, "from which it is distinguished by its sessile obtuse leaflets, occasionally simple leaves, and rather larger flowers and fruit." He gives its distribution as "Scattered throughout India in the tropical and subtropical regions, Ceylon, Japan, Philippines, N. Australia". Of course, he is here including the various infraspecific taxa in these statements (as is true of most authors).

Merrill (1917) records *V. trifolia* from Volcano Island; Parkinson (1922) lists it from Havelock island in the Andamans; Dunn & Tutcher (1912) list it from Hong Kong, New Territory, Lantao, and Macao; Ridley (1911) records it from Thailand and Lankawi, Prain

(1903) from Bangladesh and Central Bengal, Sonohara & al. (1952) from Kunigami, Nakagami, Shimajiri, Ishigaki, and Iriomoto islands, and Fong & al. (1972) from New Guinea. Again, most of these "records" probably apply to one of the infraspecific taxa, rather than to the typical form of the species.

Backer (1931) notes that "in streken met vrij krachtigen tot krachtigen oostmoeson, op periodiek stark uitfrogende grondon, in djati- en secundair bosch, in struikwildernissen, langs wegen en waterloopen, aan akkerranden, plaatselijk vaak in groote hoeveelheid. Ook wel als pagerplant gekweekt", as its habitat in Java.

Seemann (1866) asserts that *V. trifolia* is "Common on the sea-beach of all the Viti Islands", citing *Barclay s.n., Home s.n.,* and *Seemann 354,* and "Also collected on Tonga (*Forster*!), New Caledonia (*Anderson*! *M'Gillivray*!), Aneitum, New Hebrides (*M'Gillivray*!), and Sandwich Islands (*Macrae*!)" -- but it is most probable that it is var. *bicolor* (Willd.) Mold. to which he is here referring. He also avers that the species is "Common in tropical New Guinea, China, the East Indies, and islands of eastern Africa." He admits that "We have in Polynesia both the trifoliolate and the unifoliolate form of this species."

Hemsley (1894) cites unnumbered Forster and Moseley collections from Fiji, and Burkill (1901) gives its overall distribution as "Fiji, Marquesas, and Sandwich Islands, and a common sea-side shrub in the tropicas of the Old World." Again, it is most certainly the seashore varieties, not the typical form, that is being referred to here.

Raeuschel (1797) know the species only from "India orient."; Gills (1917) lists it from "S. Asia through Malaya and Japan and through New Guinea to N. Caledonia"; Darlington & Wylie (1956) describe it as from "Trop. Asia, Australia, & E. Africa". Uphof (1968) regarded it as native only in Malaya and Indonesia. Merrill (1923) says "along the seashore throughout the Philippines. In similar habitats, India to Mauritius and Japan, southward through Malaya to tropical Australia and Polynesia". Burkill (1901) says that it occurs in "Fiji and Samoa; eastward to the Marquesas Islands; Sandwich Islands; westward in the New Hebrides, New Caledonia, and Solomon Islands; and to Africa".

Voigt (1845) lists *Vitex trifolia* as cultivated in Calcutta in 1845; Kurz (1870 found it in cultivation on the Andaman Islands; Gamble (1878) lists it as in cultivation in Burma. Russell (1956) cites *U. S. Dept. Agr. Pl. Invent 190447* as taken from cultivated plants in Florida and Maryland. Loudon (1826) and Sweet (1830) maintain that it was introduced into English gardens from the "E. Indies" [probably an error for eastern India] in 1759, but Bean (1956) avers that it has been in cultivation in England since the year 1739.

The corollas are described as having been "lilac" in color on *Comanor 778,* "rich-mauve" on *Tanner 2960,* "lavender" on *Burch & Smith 4149* and *Fosberg 56425,* and described as "lavender to blue" by Datta & Majumdar (1966), "bright pale-purple" by Trimen (1895), "lavender-blue" by Patel (1968), and "purple inside, purplish outside and at the base inside on *Abedin 5080.*

A notation on the sheet indicates that pollen was taken for analysis from *Comanor 778*. Rau & Lee (1940) describe the pollen grains as 3-colpate, oblate, 17 x 26 mu, the exine granular and reticulate. Sobti & Singh (1961) report the chromosome number as 26; Sugiura (1936) reports it as 32, while Sharma & Mukhopadhyay (1963) report it as 34.

Masamune (1955) is of the opinion that the "*V. negundo*" of Matsumura (1912), Sakaguchi (1924), and Naito (1953) are actually *V. trifolia* L. He places *V. iriomotensis* Ohwi in the synonymy of typical *V. trifolia* and he records *V. trifolia* from Okinawa (Yontanza, Naha), Ishigaki (Kapaira), Taketomizima, Taiwan, Malaya, and Australia -- obviously again including the varieties.

Backer & Bakhuizen (1965) suggest that in Java *V. trifolia* L. hybridizes naturally with what they call *V. paniculata* Lam. [=*V. trifolia* var. *bicolor*] and they assert that in Java the plant is very aromatic, flowering throughout the year, ascending from 1 to 1100 feet altitude, and is found in periodically very much desiccating localities, teak forests, brushwoods and secondary forests, and also cultivated as a hedge plant.

Clarke (1885) describes what he calls *V. trifolia* as having "leaves simple and 3-foliolate, leaflets sessile obovate and obovate-oblong entire glabrate above beneath and panicles closely white-tomentose, corolla 1/3 -- 1/2 in., drupe 1/5 in. diam. black.....Panicles terminal, penultimate axillary peduncles often added.....Scattered throughout India, in the tropical and subtropical region, from the foot of the Himalaya to Ceylon and Malacca, nowhere common. -- Distrib. S. E. Asia to Japan, the Philippines and N. Australia.....Perhaps commoner than supposed, being frequently unnoticed from its close general resemblance to the universal *V. negundo*."

Kurz (1877) regarded *V. agnus-castus* L. and *V. trifolia* L. as conspecific, adopting the former epithet.

Merrill (1917) comments that "The reduction of *Lagondium vulgare* to *Vitex trifolia* Linn. was first made by Linnaeus [1754, 1759, & 1763].....which is certainly the correct disposition of it. [The species] is very widely distributed along the seashore throughout the Indo-Malayan region."

Some errors in bibliographic literature should be noted: Foreman (1972) is sometimes erroneously cited as "1971", the title-page date; similarly, the Bean (1956) reference is sometimes incorrectly cited as "1951". Hallier (1918) cites the Miquel (1858) reference as "1856", but pages 705--960 were actually not issued until 1858. The Blume (1826) references is sometimes erroneously cited as "9: 812. 1825".

The illustration given by Pope (1968) as representing typical *V. trifolia* actually depicts var. *simplicifolia* and var. *subtrisecta* only, and not typical *V. trifolia* at all. The illustration given by Burman (1737) appears to represent *V. leucoxylon* L. f., so it would appear that the *Vitex triflora odorata, sylvestris* J. Burm., previously regarded by me as a synonym of *V. trifolia*, actually should be regarded, instead, as a synonym of *V. leucoxylon*.

The "*Vitex trifolia*" of Mueller (1868), described as "crescit a fluvio Brisbani in Arnheimiam. Arbor 20' jam fruticis statu florens. Variat foliis digitate quinque-foliolatis", probably represents var. *bicolor* (Willd.) Mold. and/or *V. benthamiana* Domin.

Bolan (1935) reports that the fruit of *Vitex trifolia* is used as a cataplasm in the treatment of tumors in Malaya and India. Quisumbing (1951) says that the fruits are ground up and made into pills used in the treatment of breast cancer in China. Ebert (1907) says "Die Früchte finden arzneiliche Verwendung als Mittel gegen Kopfschmerz, Katarrh, Augenleiden, Fieber, Drüselgeschwulste, Hautkrankheiten und als Emmenagogum." Parham (1943) found the species used medicinally in Fiji. Sonohara (1952) reports its use as a windbreak, as well as medicinally in Okinawa. Gamble (1878) found it used to make hedges in Burma.

Smith (1871) notes that *V. trifolia* is "extensively used in India in native medical practice". Brugues (1908) found it "highly useful for medicine" in the Philippines, while Rageau (1957) says: "Le décoction des feuilles, aromatique, amère et nauseuse, est préconisée contre le rhumatisme aigu, les fièvres intermittentes. La plante serait resolutive des tumeurs et le fruit vermifuge, emménagogue ainsi que le racine."

According to Uphof (1968) the "Boiled leaves and twigs made into a paste are used by the natives for treating bruises. Added with Guava and leaves of Sembong, *Blumea balsamifera* DC., it is used to treat beri-beri. Leaves are recommended for dropsy. Fresh leaves are put on wounds." Heyne (1917) provides us with a long and detailed description of it economic uses in Indonesia.

Morton (1962) says: "These aromatic plants [*V. trifolia* and its var. *variegata*], commonly planted as hedges in South Florida, cause respiratory irritation, especially when being trimmed and afterward while the cuttings are still lying on the ground. Some people suffer not only asthma-like symptoms but also dizziness, headaches and nausea. Children sometimes chew the leaves but desist because of the burning taste. In the Far East, the leaves are placed in irrigation water in rice fields to protect the plants from pests, and dry, powdered leaves are used to repel insects from stored grain and clothes. The leaves are burned to drive away mosquitoes. The leaves and twigs contain cineol, l-d-pinene, camphène, terpinyl acetate and a diterpene alcohol. The leaves and fruits have various medicinal uses, as poultices, in medicinal baths, etc. The fruit is regarded as a nervine, cephalic and emmenagogue."

Crevost & Pételot (1934) tell us that "Ses petites graines, grís noirâtre, de la grosseur d'un grain de poivre, que l'on trouve chez tous les marchands de médicament, sont revêtues à la base du calice persistant dont on les débarrasse; après quoi on en fait une décoction contre les maux de tête et les maux d'yeux. On a attribué à ces graines des vertus multiples, mais leur usage est aujourd'hui assez limité [in Indochina]."

Willaman & Li (1970) describe a new alkaloid, vitricin, from the fruit of this species.

Diels (1913) cites *Forrest 579* from China; Ridley (1911) cites

Keith s.n. from Thailand. Dop (1928) cites *Lecomte & Finet 903* from Annam, *Geoffroy 17* and *Thorel 1590* & *2093* from Cambodia, *Godefroy 781* and *Pierre 330* & *380* from Cochinchina, *Spire 235* & *318* from Laos, *Balansa 3814, Bon 6165,* and *Simonds s.n.* from Tonkin, and *Kerr 7248* and *Schomburgk s.n.* from Thailand. Brown (1935) cites *Cheeseman 15* from Rarotonga and *Quayle 1281* from Nukuhiua in the Marquesas Islands.

Fletcher (1938) cites *Haniff & Nur 3584, Keith s.n., Kerr 1248* & *4602, Lakshnakava 78, Marcan 1901* & *2109, Rabil 55,* and *Schmidt s.n.* from Thailand. He gives the overall distribution as India (type), Sri Lanka, Burma, Indochina, Philippines, Hainan, China, Japan, and northern Australia, and notes that the species is also cultivated in Thailand.

Foreman (1972) cites *Waterhouse/Yale 60* and *Waterhouse 63-B* from New Guinea. Gibbs (1917) cites *Gibbs 6290* and *Koch s.n.* from Dammar Island, New Guinea. Schumann (1898) cites *Dahl 149* from Ralum. Merrill (1918) cites *Merrill Sp. Blanc. 302* [as opposed to *Sp. Blanc. 814* which is var. *simplicifolia*] which, he avers, "is common along the seashore throughout the Philippines".

Schumann & Lauterbach (1900) cite *Bamler 1:13, Dahl 149, Hollrung 486, Lauterbach 166,* and *Warburg & Lewandowsky 48* from New Guinea. They comment that the species "Ist an den Seeküsten Südasiens bis Papuasien und Japan verbreitet, auch von Britisch Neu-Guinea bekannt."

Collett & Hemsley (1890) cite an unnumbered Aplin collection from the Shan States of Burma. Drake del Castillo (1893) cites an unnumbered Le Bastard collection from the Marquesas Islands; Merrill (1908) cites *Mearns 3176* from Batan in the Philippines, noting again that the species occurs "Throughout the Philippines" along the seashores. Guillaumin (1932) cites *Kajewski 690* from Aneityum, as well as *Kajewski 66* & *84* from Tanna, commenting that it is "Already found on Aneityum, Tanna, and Epi; also New Caledonia, Australia (Queensland, North Australia), Norfolk, Fiji, Tonga, Samoa, Cook, Marquesas, Caroline, Mariana and Bismark Islands, New Guinea, Malaysia, Hawaii." Unquestionably, he is here including all the infraspecific taxa!

Hallier (1918) cites: KALANTAN: *Amdjah s.n., Winkler 3159.* LOMBOK: *Elbert 674* & *1875.* SUMBAWA: *Colfs 125, Elbert 3508* & *3825, Pretorius s.n., DeVriese s.n., Beccari 269, Daalen 223.* FLORES: *Elbert 4323, Gründler 4342.* LUZON: *Hallier 4230c, Perrott s.n., Vidal 850, Elmer 7877, Vanoverbergh 321.* TIMOR: *Zippelius 3726.* NEW GUINEA: *Koch A.20.* MINDORO: *Cuming 1493.* He lists the species also from Mauritius, Réunion, India, Sri Lanka, Malacca, Thailand, Hainan, southern China, Korea, Andaman Islands, Java, Banda, northern Australia, Queensland, New Caledonia, Witie Islands, Tonga, Marquesas, Oahu, Sibuyan, Taiwan, Ryukyu Islands, and Japan.

Petzak & Rechinger (1967) cite from Persia: *Popov 51/184, Shar. 1305-E.* Afghanistan: *Griffith 6057.* Pakistan: *Rechinger 29884.* He gives the overall distribution as "Asia tropica et Afghanistan usque ad Sinam, Japoniam, insulae Philippines, Indonesia, Nova Guinea, Nova Caledonia, Hawaii, Australia, Africa, Mauritius,

Madagascar, Natal." Brown (1935) refers to it as "A littoral species distributed from eastern Polynesia westward to the Old World tropics".

Keys (1976) refers to the seed as bitter and pungent, containing an essential oil of 55 percent camphene, 20 percent limonene, and some pinene) and acetic acid. He reports its use as a sedative and analgesic - the dose being 5--10 gm. Kariyone (1967) found the fruits to contain vitricine, $C_{17}H_{15}O_3N$, mp. 237° (decomp.), $[\alpha]$ 24/D + 108° ($CHCl_3$). Shinozaki (1921) isolated l-a-pinene, camphene, terpinyl acetate, and diterpene alcohol in a volatile oil. Schimmel (1894) reports finding cineol in the foliage. Willamin & Li (1970) isolated vitricine from the fruit. Steinmetz (1957) isolated an essential and an alkaloid, reporting the leaves employed in medicine as an alterative, tonic, diuretic, anodyne, febrifuge, demulcent, the fruit as a nervine, emmenagogue, and cephalic, and the roots as a local anodyne.

Masilungan & his associates (1964) found that an extract of the leaves gave positive anticancer results.

Burkill (1966) notes that "The leaves are much used medicinally, chiefly in poultices, and probably there is no complaint for which the people of Malaysia may not use them, sometimes with the addition of lime, sometimes with camphor, or vinegar, or pepper, or *Nigella* seed, and at times only with rice....The plant is also used internally.....The leaves are employed in medicinal baths both in Malaya and the Dutch Indies. There is a little alkaloid in them.....Malays sometimes powder the leaves and put them into the rice-bin as they keep away insects, or among clothes to protect them.....The Malays use burning leaves to drive away mosquitoes and evil spirits. In Java the leaves are put in the water when rice-fields are irrigated in order to drive away pests."

Burkill & Haniff (1930) assert that "A decoction of the boiled root, or an infusion of the leaves may be drunk for fever after childbirth". Ridley (1897) reports it being used to treat consumption -- he says: "Grind the leaves with a little garlic, turmeric, and pepper and take the preparation in the form of pills." Heyne (1927) lists many uses, noting that a tincture or decoction of the leaves is of some value in treating intestinal complaints.

Maxwell (1906) reports its use for poulticing the swollen trunk of elephants. Rumpf (1886) avers that the branches may be hung in the house to emit a pleasant smell. In a popular folk-tale the stirring of rice with a spoon made of this wood "renews youth".

Shimozaki (1921) and Gildemeister (1931) maintain that the aroma given off by this plant is due to a volatile oil. They found that dry twigs yielded 0.11--0.2% of this oil and dry leaves yielded).28%. They assert that pinene and camphene are the chief constituents of this oil, with some cineol also present.

Petelot (;953) repeats most of the previously reported uses of this plant in Indochina:

Ramachandran Nair and his associates (1975) record that "adsorption chromatography on silica gel of the chloroform abstract of dry leaves of *Vitex trifolia*.....has yielded two methylated flavones of rare occurrence. Based on chemical as well as UV, IR,

PMR and Mass spectral data, the major compound has been characterised as 5, 7-dihydroxyl-3, 3', 4', 6-tetra methoxyl flavone (3, 3', 4'. 6'-tetra methyl quercetagetin) and the minor as artemetin (5-hydrox-3, 3', 4', 6, 7-penta methoxyl flavone) by direct comparison with authentic sample. The earlier observation regarding the variation of flavonoid pattern with reference to plant geography in *Vitex* is [thus] further supported."

Hartwell (1971) reports the bark and leaves used as a potion in the treatment of old cancers and glandular tumors in Nigeria and breast cancers in China -- for the latter use the leaves are ground up and made into pills.

Dymock and his associates (1893) assert that this plant is purported to have the same properties as *V. negundo* [this is not surprising!], but he says that "Two varieties are recognized: one with pale blue flowers (Svetapushpi), and the other with blue flowers (Pushpanílika). Among the Tamils [in India], one of these plants is supposed to be male and the other female, and for this reason they are usually combined together in their prescriptions. In the Nighantas, Nirgundi is described as cephalic, pungent, astringent, bitter and light; a remedy for colic, swellings, rheumatism, worms, leprosy, dyspepsia, phlegm, and boils. The leaves are generally used as a discutient fomentation in sprains, rheumatism, swelled testicles, contusions, &c. The root is thought to be a tonic, febrifuge, and expectorant, and the fruit nervine, cephalic, and emmenagogue. Mahometan physicians use these plants as substitutes for *Vitex agnus-castus*, the fruit of which is imported into India and sold in the bazara as Sambhálu-ke-bij." For more by this author on this and related taxa, see under var. *bicolor* in these notes.

Li (1979) describes the supposed magical properties of this and related taxa in this genus.

Additional (and variant) common and vernacular names reported for this species and not previously listed by me are: "achhi nagad", "bois nouhou", "caryophyllon", "ching-taŭ", "dangla", "dholi nagdi", "dholi nagod", "Folia vitex trifoliae", "Fructus vitex trifoliae", "Fructus viticis", "galounie", "gapasgapas", "garyophyllon", "gatillier trifolié", "gendarasi", "gendavasi", "hand of Mary", "hôgâgii", "indrani", "karé-lakki", "kok pa pay", "kyoung-ban", "lagoendi oetan", "lagondie", "lagundie", "lagunding-dagat" [lagundi, *Vitex trifolia* + dagat, ocean], "lakki", "langghoendhi", "langoendi", "legoendi", "lemuning", "lenggundi", "lilas de Perse", "lingur", "lou sin wan", "man-ching", "man-ching-taŭ","meean-milila", "mitsu-ba-hama-gô", "mituba-hamago", "nagod", "nichinda", "nigundi lingur", "niguri", "nikka", "nirgunda", "nirgundi", "nirnochi", "nir-nochi", "niruvávili", "nishinda", "nisiada", "nisinda", "nochchi", "nochi", "pajpati", "pani samalu", "panika sanbhalu", "pani-sanbhalu", "panj-angushte-abi", "pushpanílika", "quan âm biển", "Radix vitex trifoliae", "rala", "rara", "sambhálu", "seng fa che", "sephálika", "sindhula", "sindhuvára", "sudu-nika", "surasa", "svetapushpi", "ta king tse", "three-leaved chaste-tree", "three-leaved bench creeper", "three-leaved vitex", "thuốc ôn",

"thuốc kinh", "thúốc kinh", "thuốc ôn", "vanai", "vellai-nochi", "vettai-nochi", "vitex à feuilles ternées", and "vitex de tres hojas". It is almost certain that many, if not most, of these names apply to one of the infraspecific taxa, rather than to the typical form of this species.

The *Sohmer 8237* and *Sumithraarachchi DBS.462*, distributed as *V. trifolia*, actually are *V. altissima* L. f., while *Collector undesignated 15* is *V. capitata* Vahl; *Rechinger 29984* is *V. negundo* var. *trifoliolata* Mold.; *D. Anderson 2143, Banks & Solander s.n.* [Friendly Islands], *Boorman s.n.* [Tweed Heads], *Brass 25548, Carrick & Enoch JC.255, Castro & Melegrito 1636, Dietrich s.n.* [Prope Brisbane river], *Fairchild & Dorsett 499, Fosberg 36763, Garber 611, Guillaumin & Baumann-Bodenheim 11493, Lewandowski 48, Mc Gregor 379, McKee 2000, Mueller-Dombois 68041901, H. E. Parks 20800 & 20857, Parks & Parks 22573, C. B. Robinson 304 & 2493, Theobald & Grupe 2320, J. B. Thompson 439, Vaupel 389, Villamil 284, Waas 637*, and *Wright s.n.* [Feejee Islands] & *s.n.* [Samoan Isls.] are *V. trifolia* var. *bicolor* (Willd.) Mold.; *H. E. Parks 16178* is *V. trifolia* var. *bicolor* f. *albiflora* (Kuntze) Mold.; *Cockburn SAN.68413, Koyama 7311, Stone 2721, Surapat 45*, and *Taam 1702* are *V. trifolia* var. *simplicifolia* Cham.; *Amano 7191, Buchholz 1536, Clemens 43494a, Correll & Correll 48992, Doty 11730, Doty & Newhouse s.n., Elmer 7877, Forster 116, Fortune 90, Fosberg 11981, 34926, 36709, 37304, & 37681, Gillespie 4380, Guillaumin 8540, Helfer 6057, Herb. Mus. Paris s.n.* [Timor], *Herb. Schles. Bot. Tauschv. 113, Hu 12464, Lamoureux 2896, W. H. Lewis 7124, McKee 2401, E. D. Merrill 957, C. B. Robinson 2449, Rothdauscher s.n.* [Manilla, 1879], *Sauer 3381, A. C. Smith 4559 & 6078, Sohmer s.n.* [St. Louis Heights], *Specht 42, Stokes 1, Taam 1702, J. H. Taylor 47, Van Royen & Sleumer 8249*, and *Whitford 674* are *V. trifolia* var. *subtrisecta* (Kuntze) Mold.; and *Stone 6922* is *V. siamica* F. N. Will.

Additional citations: BAHAMA ISLANDS: Grand Bahama: *Correll & Kral 42981a* (Ld). TANZANIA: Tanganyika: *Tanner R.T.2960* (Ba). SEYCHELLES ISLANDS: Mahe: *Sauer 3709* (Ws). MASCARENE ISLANDS: Mauritius: *Sauer 2811* (Ws). INDIA: East Punjab: *Thomson s.n.* [Panjab, 1-4000 ped.] (Mu--654). SRI LANKA: *Collector undetermined s.n.* [Kankesanturai, February 1890] (Pd); *Comanor 778* (N); *Davidse 7530* (W--2803427); *F. R. Fosberg 56425* (N); *Thwaites C. P.1955* (Br, Pd); *Worthington 177* (K). BURMA: Upper Burma: *Huk s.n.* [25-7-1890] (Pd). PHILIPPINE ISLANDS: Palawan: *E. D. Merrill Sp. Blanc. 302* (N, W--903979). FIJI ISLANDS: Viti Levu: *Meebold 16492* (Mu). AUSTRALIA: New South Wales: *Meebold 3391* (Mu). SAMOAN ISLANDS: Manono: *Whistler W.4527* (W--2887919). Nu'utele: *Whistler W.4130* (W--2885723). CULTIVATED: Florida: *Burch & Smith 4149* (Ld). India: *Herb. Hort. Bot. Calcutt. s.n.* (Mu--3799). Malaya: *Soo 369* (Kl--1369). Pakistan: *Abedin 5080* (Kh). Sri Lanka: *Collector undetermined s.n.* [Oct. 22, 1914] (Pd). MOUNTED CLIPPINGS & ILLUSTRATIONS: Koord. & Valet., Atlas Baumart. Java 6: fig. 292. 1914 (W); E. H. Walker, Fl. Okin. South. Ryuk. 893--894. 1976 (W).

VITEX TRIFOLIA var. *BICOLOR* (Willd.) Mold.

Additional & emended synonymy: *Vitex bicolor* Willd., Enum. Hort. Bot. Berol. 2: 660. 1809. *Vitex negundo* L. var. Cham. ex D. Dietr., Syn. Pl. 3: 611, in syn. 1843. *Vitex negundo* var. *bicolor* H. J. Lam, Engl. Bot. Jahrb. 59: 27. 1924. *Vitex ternifolia* Hort. ex Mold., Phytologia 6: 174, in syn. 1958. *Vitex negundo* var. *bicolor* Lam.[arck] ex Mold., Phytologia 17: 51, in syn. 1968. *Vitex negundo bicolor* H. J. Lam ex Mold., Fifth Summ. 2: 724, in syn. 1971. *Vitex trifolia* var. *bicolor* Mold. ex Zepernick, Baessl.-Arch., ser. 2, 8: 133, in syn. 1972. *Vitex trifolia* var. *bicolor* (Lam.) Mold., Phytologia 50: 167, in syn. 1982. *Vitex trifoliata* var. *bicolor* (Willd.) Whistler, in herb. *Vitex intermedia* Carrick & Enoch, in herb. [not *V. intermedia* Blanchet, 1942, nor Schau., 1940]. *Vitex negundo bicolor* (Willd.) H. J. Lam, in herb. *Vitex negundo* var. *bicolor* (Lam.) Mold., in herb. *Vitex negundo* var. *bicolor* (Lam.) Willd., in herb.

Additional & emended bibliography: Willd., Enum. Hort. Bot. Berol. 2: 660. 1809; Roth, Nov. Pl. Sp., imp. 1, 316. 1821; Sweet, Hort. Brit., ed. 1, 1: 323 (1826) and ed. 2, 416. 1830; Loud., Hort. Brit., ed. 1, 246 (1830) and ed. 2, 246. 1832; Decne., Nouv. Ann. Mus. Hist. Nat. Paris 3: 400. 1834; G. Don in Loud., Hort. Brit., ed. 3, 246. 1839; G. Don in Sweet, Hort. Brit., ed. 3, 551. 1839; D. Dietr., Syn. Pl. 3: 611. 1843; Schau. in A. DC., Prodr. 11: 683--684. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 501. 1858; Bocq. in Baill., Rec. Obs. Bot. 3: 253. 1863; F. Muell., Fragm. 6: 15. 1868; Naves & Fern.-Villar in Blanco, Fl. Filip., ed. 3, 6: pl. 228. 1878; Fern.-Villar in Blanco, Fl. Filip., ed. 3, 4: 160. 1880; Dymock, Veg. Mat. Med. W. India 499--501 & 785. 1884; Nairne, Flow. Pl. West. India 246. 1894; Krämer, Samoa-Inseln 2: 119, 120, 379, & 384. 1903; H. Hallier, Meded. Rijks Herb. Leid. 37: 42--43. 1918; E. D. Merr., Enum. Philip. Flow. Pl. 3: 394 & 395. 1923; Fedde & Schust., Justs Bot. Jahresber. 47 (2): 246. 1929; Fedde, Justs Bot. Jahresber. 47 (2): 423. 1929; Fedde & Schust., Justs Bot. Jahresber. 56 (2): 286. 1937; Ohwi, Act. Phytotax. Geobot. Kyoto 7: 29. 1938; Fedde & Schust., Justs Bot. Jahresber. 60 (2): 576. 1941; Yuncker, Bern. P. Bishop Mus. Bull. 184: 60. 1945; Parsa, Fl. Iran 4 (1): 541. 1949; Corner, Wayside Trees, ed. 2, 708, 710, & 711. 1952; Sonohara, Tawada, & Amano, Fl. Okin. 132. 1952; O. Degener, Willdenowia 1: 148. 1953; Naito, Scient. Rep. Kagosh. 2: 60. 1953; Pételot, Pl. Méd. Cambod. Laos Vietn. 2: 248 (1954) and 4: 171. 1954; Masamune, Scient. Rep. Kanazawa Univ. 4: 49. 1955; Liu, Illustr. Nat. Introd. Lign. Pl. Taiwan 2: 1229. 1962; Mold., Phytologia 17: 49--55. 1968; Mold., Résumé Suppl. 16: 10, 12, & 29 (1968) and 17: 6. 1968; B. C. Stone, Micronesica 6: [Fl. Guam] 509. 1970; Sykes, N. Zeal. Dept. Sci. Indust. Res. Bull. 200: 206, 216, & 314. 1970; Mold., Fifth Summ. 1: 239, 240, 258, 259, 263, 264, 279, 282, 293, 303, 307, 312, 319, 320, 329, 331, 333, 334, 338--341, 343, 344, 349, 351, 352, & 375 (1971) and 2: 711, 712, 714, 719, 723--725, 728, 930, & 970. 1971; St. John & A. C. Sm., Pacif. Sci. 25: 341--342. 1971; Fosberg, Atoll Res. Bull. 160: 13. 1972; Zepernick, Baessl.-Arch., ser. 2, 8: 133--134, 152, 188, 205--207, 209, 263, & 306. 1972; Mold., Phytologia 23: 425 (1972) and 25: 233, 235, &

& 245. 1973; Altschul, Drugs Foods 246--247. 1973; Mold., Phytologia 28: 447 & 452. 1974; Roth, Nov. Pl. Sp., imp. 2, 316. 1975; Mold., Phytologia 34: 266, 268, & 280. 1976; Stargardt, Journ. Biogeogr. 4: 225. 1976; E. H. Walker, Fl. Okin. South. Ryuk. 893--894, fig. 179. 1976; Fosberg, Falanruw, & Sachet, Micronesica 13: 30. 1977; Mold., Phytologia 36: 38. 1977; Fosberg, Sachet, & Oliv., Micronesica 15: 239. 1979; Fosberg, Otobed, Sachet, Oliver, Powell, & Canfield, Vasc. Pl. Palau 38. 1980; Mold., Phytol. Mem. 2: 228, 229, 247, 248, 252, 253, 266, 269, 282, 294, 298, 303, 309--311, 319, 321, 323--325, 328--334, 338--343, 367, 460, & 595. 1980; Mold., Phytologia 45: 492 (1980), 48: 486, 487, & 490 (1981), and 50: 252, 254, & 267. 1982.

Recent collectors describe this plant as a small to large, diffuse, much-branched shrub, 0.5--4 m. tall, spreading and often forming thickets or several forming a single row on the beaches, or as a treelet or small, slender, much-branched tree, 5--10 m. tall; trunk (when a tree) to 12 cm. in diameter at breast height; stems (when a shrub) often horizontal, about 2 cm. in diameter; young branches tetragonal, ridged; outer bark light- or gray-brown, the under surface light-brown or green; inner bark cream-color or yellow-cream; wood cream- or straw-color to yellow; sap colorless; secondary branches bushy; leaves fragrantly aromatic; leaflets 3--5, grayish- to yellow-green or light-, mid-, or dark-green and dull or semiglossy above, pale- or gray-green to gray beneath, dry-textured; inflorescence terminal; flower-buds pale-green; flowers fragrant; corolla gamopetalous, with one lobe extended into a lip; fruit at first green or pale-green, turning pink, purple or black when ripe, spherical.

The corollas are said to have been "blue" on *Balgooy 2305, Burgess 40403, Canfield 726, Davidse 7530, Davidse & Sumithraarachchi 9025, MacDaniels 2003* & *3022, Meijer SAN.58806, Parks 20800, Riley 52,* and *Sumithraarachchi & Sumithraarachchi DBs. 861,* "bluish" on *Waas 637,* "pale-blue" on *Hallier 3512b* and *Mueller-Dombois 68041901,* "intense sage-blue" on *Hallier 3512a,* "bluish-purple" on *Sumithraarachchi & Jayasuriya DBS.232,* "purple" on *Amaratunga 569, Brass 28095, Bryan 972, Cockburn 68408, Isles & Croft NGF.32225, Larivita & Katik LAE.70526, McKee 2000, Tan s.n., Waas 2137,* and *Whistler 619* & *1326,* "light-purple" on *Whistler 512,* "violet" on *Baumann-Bodenheim 5176, Brass 25548, Philipson 10362,* and *Robinson 305,* "pale-violet" on *Carroll 22,* "mauve" on *Alston 1327,* "rich-mauve" on *Tanner 2960,* "lavender" on *Brass 21928, Falanruw 3510, Whistler 1211,* and *Yuncker 15011,* and "lilac" on *Fairchild & Dorsett 499* and *Robinson 304* & *2493.* Fairchild & Dorsett refer to the plant as a "handsome large shrub with beautiful lilac flower clusters".

Recent collectors have encountered the plant in sandy soil with poor drainage, in coral sand, and on sandy flats, sand cays, and shingle ridges, on sandy seashores and strand, along brackish water coastlines, at the edges of lagoons, in seaside jungles, on coral rock and in coral quarries, rooting in permanent water on riverbanks, in coppices and open woodland in the littoral zone,

on open hillsides and stony schist slopes, and in coconut plantations and among native coconuts just back of the *Spinifex* zone, from sealevel to 800 m. altitude, flowering and fruiting in every month of the year. In Sri Lanka Mueller-Dombois found it on sandy beaches of sheltered bays with *Spinifex* mixed in the herb layer. Theobald & Grupe refer to it as "locally abundant" and Sumithraarachchi & Jayasuriya call it "a very common tree" there, while Fosberg found it "common on low berms of coral sand and gravel rock on low beach ridges covered by unevenly closed scrub forest". Brass reports it "common on narrow sand beaches on the inner side of the mangroves" and "frequent in the littoral strip" in New Guinea.

Burgess refers to it as "common at the edge of the shore on all turtle islands" in Sabah; Stoddart reports it "common" on the islands of the Great Barrier Reef. Tan describes it as a common shrub along the beaches of Sarawak. Fosberg calls it "dominant in thickets at the top of the beach" in Java. Canfield encountered it "in sandy soil with *Muntingia, Eugenia, Polyscias,* and *Plumeria*". Carroll reports that it "is said to have been present before European contacts" in the Caroline Islands. Falanruw refers to it as "small trees common along the shores and used as a hedge" on Truk. MacDaniels refers to it as "occasional" in New Caledonia and Riley calls it "occasional" on Guadalcanal. Bryan found it "in a pigpen" (!) on Tutuila.

Willdenow (1809) says of the type of this variety: "Habitat in India orientalis". *C. B. Robinson 304* is said to be representative (according to Merrill) of the *Lagondium vulgare* of Rumpf usually placed in the synonymy of typical *V. trifolia* L.

Nairne (1894) and Parsa (1949) regard *V. bicolor* Willd. as typical *V. negundo,* but this is quite impossible. Naves & Fernandez-Villar (1878) regard it as a synonym of what they call "*V. leucoxilon ?* Blanco", which is the true *Vitex negundo* L.

Some collectors refer to the leaves of *V. trifolia* var. *bicolor* as "glaucous" beneath, but this is not strictly true as they are always densely gray-puberulent beneath.

The Ohwi (1938) reference in the bibliography (above) is sometimes erroneously cited as "8: 29".

Vernacular and common names reported by recent collectors and authors include "gasigi", "kaju labundé", "katree", "lagondi", "lala", "legundi". "lingúr", "namelega", "namulenga", "nieke", "nikki", "nirgundi", "nir-nochchi", "nisinda", "nochcho", "pani-ki-sambhálú", "two-coloured chaste-tree", "yaeyama-hamago", and "yaeyama-hama-gô" [yaeyama is a generic vernacular name for *Vitex*].

The variety was introduced into cultivation in England, according to Sweet (1826), from the East Indies in 1810.

The *Mueller-Dombois 68041901* collection, cited below, serves as voucher for ecologic studies and the *Carroll 22* collection for ethnobotanic studies.

Fosberg and his associates (1979) list this variety from Guam, Maug, Pagan, Saipan, and Tinian in the Marianas Islands, Babeldaob, Ifaluk, Kapingamarangi, Kayangel, Koror, Kusaie, Lukunor, Moen,

Ngarakabesang, Nukuoro, Palau, Ponape, Satawan, Sonsoroi, Tobi, Truk, and Yap in the Caroline Islands, Abaiang in the Gilbert Islands, and Nauru island.

The juice of this plant is used in the Ryukyu Islands to repel mosquitoes. Altschul (1973) reports that its leaves are rubbed on the body and head to cure fevers or made into a poultice to place on abrasions, citing *Garber & Christophersen 611* and *Degener & Ortonez 13620* as authority. Yen reports that on Futuna island the leaves are used medicinally to treat toothache.

Zepernick (1972) asserts that this plant is used in the treatment of bone fractures: "Aerriebene Blätter der *Vitex trifolia* var. *bicolor* werden auf die Bruchstelle gelegt" in the Fiji Islands. In Samoa, he says, "Gegen Tuberkolose trinkt man Saft vom Stamm der *Vitex trifolia* var. *bicolor*" and "Gehirnkrankheiten.... Blattsprosse der *Vitex trifolia* var. *bicolor* werden zerstoszen, in ein Stück Blattbasis der Kokospalme gewickelt, in Wasser gelegt und die Flüssigkeit in der Nase gestopft" and "Als fiebersenkendes und schweisztreibendes Mittel zerstöszt man die Blätter der *Vitex trifolia* var. *bicolor* und die Blattsprosse der *Alphitonia zizyphoides,* fügt Wasser zu, seiht durch und trinkt die Flüssigkeit". In the same Samoan Islands, in the treatment of swellings "Blätter der *Vitex trifolia* var. *bicolor* und junge Blätter der *Alphitonia zizyphoides* werden zerstoszen, Wasser zugefügt, durchgeseiht und die Flüssigkeit getrunken."

Lamoureux informs us that the plant is commonly cultivated as a hedge on Midway Island.

Dymock (1884) reports the leaves, roots, and fruit of what he calls "*Vitex bicolor* Willd." occur in native materia medica: "Under the names Nirgundi and Sindhuvara Sanskrit writers describe two species of *Vitex,* or possibly two varieties of *Vitex bicolor*. The properties of both appear to be considered identical. The leaves are generally used as a discutient fomentation in sprains, rheumatism, swelled testicles, contusions, &c. The root is thought to be tonic, febrifuge and expectorant, and the fruit nervine, cephalic and emmenagogue.

"Mahomedan writers under the Arabic name of Athlak and Persian Panjangusht describe what they call the Agnis of the Greeks, and identify it with the Sambhálu of India. The latter article as sold in the Bombay shops is certainly the fruit of a *Vitex*, but not that of *V. bicolor*, being less than half its size [probably the fruit of *V. agnus-castus* L.]" He avers that Mohamedan doctors in Pakistan commonly substitute the fruits of *V. trifolia* var. *bicolor* for those of *V. agnus-castus*.

Dymock continues his description of what he regards as *Vitex bicolor*: "A shrub growing in patches; branchlets, panicle, and underside of the leaves white, with a fine tomentum; leaves petioled, 3 to 5 foliolate; leaflets lanceolate, long acuminated, entire, or coarsely cut and crenated [this cannot apply to *bicolor*!]; panicle terminal, pyramidal; flowers light blue; berry black, the size of a pea. (Bombay Flora, p. 201). The habit of the shrub is variable; when growing near the sea it has almost always 3 foliolate entire leaves, the leaflets being attenuated

into the petioles. Inland, the shrub has a more delicate appearance; the petioles of the leaves are much longer; the leaflets from 3 to 5 in number are often serrated [this is the true *Vitex trifolia* L.]; the flowers do not vary. The serrated variety is preferred for medicinal purposes. amd is called Kátree. The leaves of both varieties appear to me to be equally aromatic: the odour reminds one of the English Bogmyrtle (*Myrica gale*, Linn.); the taste is bitter and nauseous. The berry is very feebly aromatic." It seems clear that Dymock is describing the true *Vitex trifolia* L. as well as its var. *bicolor* (Willd.) Mold.

Fedde & Schuster (1927) cite *Volkens 425* from the Caroline Islands, listing it also from Amboina. Hallier (1918) cites the following collections and maintaining *V. bicolor* Willd. as a valid species: TANGANYIKA: *Hildebrandt 1254*. SRI LANKA: *Oltmans 62*. INDIA: *Hohenacker 703* and *Mokim s.n.* JAVA: *Blume s.n., DeVriese s.n., Junghuhn s.n., Kuhl & Hasselt s.n., Ploem s.n., Raap 386, Richter s.n.*, and *Waita s.n.* SUMBAWA: *Elbert 3729* & *4118* and *Gründler s.n. [Elbert 3927]*. FLORES: *Weber s.n.* TIMOR: *Zippelius s.n.* CELEBES: *Elbert 2986* & *3337* and *Forsten s.n.* MUNAH: *Elbert 2873*. MINDANAO: *Elmer 11999*. BASILAN: *Tarrosa 19553*. PONAPE: *Hallier 3512a* & *3512b*. AMBOINA: *Reinwardt s.n.* BANDA: *Collector undetermined s.n.* NEW GUINEA: *Hollrung 486* and *Lewandowsky 48*. NEW CALEDONIA: *Deplanche 84bis* and *Vieillard 3069*. He comments that "Diese Art hat die sparrig dichasich verzweigten, erst an den äussersten Enden in Wickel übergehenden Rispenäste des *V. trifolia*, ja sogar noch mehr aus einander gezogene Blüthen und daher einen noch grösseren Querdurchmesser der Rispen, auch unterscheidet sie sich von ihm durch 3--5 Blättchen, von denen die 1--3 mittleren deutlich gestielt sind, und anscheinend auch durch etwas kleinere Blüthen. Von *V. Negundo* L. aber scheint sie sicher ausser den Blüthenständen auch noch durch grössere Blumenkronen und Früchte und durch niemals gesägte Blätter der Blüthenzweige zu unterscheiden. Schauer und Miquel haben sie daher wohl mit Recht als eine besondere Art behandelt. Immerhin ist es wünschenwerth, dass Form, Grösse und Farbe der Blumerkronen an lebenden Pflanzen verglichen werden." He adds that probably the collections which he cited earlier from Yap, Truk, and Leleh as typical *Vitex trifolia* actually represent *V. bicolor*. I may add that his observations about this taxon, as compared with typical *Vitex trifolia* and *V. negundo*, are very astute and agree with my own findings. I differ only in regarding the present taxon as a variety, rather than a true species.

Christophersen (1935) cites *Garber 611* from Tau, *Garber 995* from Ofu, *Eames 36* from Upolu, *Bower s.n.* and *Christophersen 936* & *2849* from Savaii in the Samoan Islands and *Wilder 48* as cultivated there. Miquel (1860) cites his *no. 1107* from Banka.

Fosberg and his associates (1977) cite *Dickinson & Mersereau 9* from Maug and *Falanruw 3008* from Pagan in the Marianas Islands. Walker (1976) cites *A. Smith 68* from Ishigaki and *Amano 5932, Hatusima 23191*, and *SIRI 6749* from Iriomote -- the last two of these said to have been taken from the type tree of *Vitex iriomotensis* Ohwi, a species which, by the way, Masamune (1955) errone-

ously places in the synonymy of typical *V. trifolia* L.

St. John & Smith (1971) record the variety from Futuna in the Horne Islands on the basis of *Yen 448,* referring to it as "A widespread taxon.....in the Pacific, usually near the sea." Seemann (1864) records it from Uvea on the basis of *Graeffe 20.* Fosberg (1972) lists it from Motutapu in the Raratongan Islands on the basis of *Philipson 10362.*

Stone (1970) describes *V. trifolia* var. *bicolor* as follows: "An erect branched shrub; leaves 3- occasionally 5- (or 7-) foliolate, the leaflets lanceolate, acuminate, the central one longest (to 11 cm), with petiolule to 1--2 cm long, other leaflets smaller and on shorter petiolules, all densely puberulent dorsally; petiole 2.5--6 cm long; branchlets 4-angled and puberulent; flowers in terminal panicles; on puberulent cymes; calyx about 3 mm long, grey-puberulent; corolla blue-violet, about 4 mm. long; puberulent; drupe black, 5--6 mm long, subglobose, 1-seeded.

"An E. African-Indo-Malayan-Pacific species; it is possibly native in Guam, but its occurrence is against this, and it is probably introduced, though no doubt long ago, as it was collected in Guam by Gaudichaud and by Lesson. The foliage is aromatic, and parts of the plant have medicinal uses."

Backer & Bakhuizen (1965), calling it *V. paniculata* Lam., describe it as follows: "Leaflets 3--5, the median one on a petiolule of 1/2 -- 2 cm length, ovate-oblong or oblong-lanceolate, very acutely acuminate , 3 1/2 -- 10 cm by 1 1/2 -- 3 1/2 cm, the 2 adjacent leaflets (in the 5-foliolate leaves) smaller or shorter petioluled; outermost leaflets (in 5-foliolate leaves) smallest, sessile or subsessile; petiole 2--6 cm. Panicles pyramidal-ovoid, lax, 6--20 cm long; cymes distinctly forked, 2--10 cm long (inclusive of 1/2 -- 4 cm peduncle), ∞ -flowered, lax; calyx 1 1/2 -- 3 mm; corolla-tube 4--5 mm; median lobe of lower lip 3--4 mm by 2 1/2 --3 mm.....sandy beaches and adjacent localities, especially on older parts of beach-wall, rarely more inland.....Very frequently confused with *V. negundo* L.....Sometimes difficult to be distinguished from the preceding species [*V. trifolia* L.] with which it seems to hybridize." Merrill (1923) also notes that it occurs in the "Philippine and extra-Philippine range of the species and [is] scarcely distinguishable from it."

Sonohara and his associates (1952) refers to it as "A rare seashore shrub" on Iriomote and Ishigaki in the Ryukyu Islands. Yuncker (1959) cites *Forster s.n., Moseley s.n.,* and *Yuncker 15011* from Tongatapu, *Yuncker 15801* from Nomuka, and *Crosby s.n.* from Vavau in the Tongan Islands, noting that it is "occasional throughout Tonga" and "From eastern Africa and India through Malaysia to Polynesia. Presumably the *V. trifolia* L. of Hemsley's and Burkill's lists." He describes it as a "Shrub or small tree up to 3 m. tall, twigs densely tomentose. Leaves opposite, mostly palmately five-compound, leaflets elliptic-lanceolate, acuminate, base acute, lateral leaflets smaller than the terminal one, up to 10 cm. long and 3 cm. wide, pinnately nerved, dark above, lower surface densely white-tomentose. Flowers about 5 mm. long, lilac or lavender, short-pedicellate, in large, branching, axillary or terminal,

tomentose, paniculate clusters."

Material of *V. trifolia* var. *bicolor* has been widely misidentified and distributed in herbaria as typical *V. trifolia* L.or *V. negundo* L. On the other hand, the *Elmer 15236, Hohenacker 703,* and *Sachet 896,* distributed as *V. trifolia* var. *bicolor,* seem better regarded as representing var. *subtrisecta* (Kuntze) Mold.

Additional citations: TANZANIA: Tanganyika: *Tanner 2960* (N). SRI LANKA: *Alston 1327* (Pd); *Amaratunga 569* (Pd); *Davidse 7530* (Ld); *Davidse & Sumithraarachchi 9025* (Ld, W--2808699); *F. R. Fosberg 36763* (W--2584960A), *56425* (N, W--2811423); *Herb. Schmiedel s.n.* (Mu); *Mueller-Dombois 68041901* (Ac, N, Pd, W--2612107); *N. D. Simpson 9688* (Pd); *Sumithraarachchi & Jayasuriya DBS.232* (Ld, W--2803440); *Sumithraarachchi & Sumithraarachchi DBS.861* (W--2805418); *Theobold & Grupe 2320* (Pd, W--2602994); *Waas 637* (W--2803415), *2137* (W--2877398); *Worthington 5142* (K, K). THAILAND: *Congdon 1005* (Ac). MALAYAN ISLANDS: Bumbon Besar: *Balgooy 2305* (Ac, N). Langkawi: *B. C. Stone 10962* (Kl--16411). PHILIPPINE ISLANDS: Luzon: *Ahern 166* (W--445160), *223* (W--445199), *255* (W--445214), *814* [28] (W--445883); *Borden, Herb. Philip. Forest. Bur. 2035* (Pd, W--625554); *Cailipan, Herb. Philip. Forest. Bur. 25637* (W--1376034); *E. D. Merrill 1106* (W--436080); *R. Meyer, Herb. Philip. Forest. Bur. 2276* (W--439916); *Whitford 853* (W--851805); *R. S. Williams 185* (W--706849). Masbate: *W. W. Clark, Herb. Philip. Forest. Bur. 2527* (W--852302). Mindanao: *Ahern 671* [71] (W--445412, W--445849); *Elmer 11999* (W--779705); *Miranda, Herb. Philip. Forest. Bur. 17976* (W--902651); *R. S. Williams 2978* (W--708201). Mindoro: *J. V. Santos 5258* (W--2246546). MARIANAS ISLANDS: Guam: *R. C. McGregor 379* (W--713072); *P. H. Moore 726* (W--2903563); *J. B. Thompson 439* (W--712873). Maug: *Dickinson & Mersereau 9* (W--2784940). Pagan: *Falanruw 3008* (W--2784839). Saipan: *Holt 17-2* (W--2395496). Tinian: *Konda 3* (Ba). PALAU ISLANDS: Kayangel: *Canfield 726* (W--2881443). Yap: *Falanruw 3362* (W--2881148). GREATER SUNDA ISLANDS: Banguey: *Castro & Melegrito 1636* (W--1349668). Celebes: *Kaudern 452* (N). Java: *F. R. Fosberg 44519* (W--2638454). Sabah: *Meijer SAN.58806* (Ld); *Villamil 284* (W--1375169). Sarawak: *Carrick & Enoch JC.255* (Kl--3240); *Tan s.n.* [S.A.R.28818] (Ft--11327). Selingan: *Burgess 40403* (Ld); *Cockburn 68408* (Ld). Sumatra: *Fairchild & Dorsett 499* (W--1426529); *Lütjeharms 4655* (W--1755651). LESSER SUNDA ISLANDS: Buton: *C. B. Robinson 2493* (W--775442). MOLUCCA ISLANDS: Amboina: *C. B. Robinson 304* (W--654622), *305* (W--654623). Soela: *Bloembergen 4788* (N). CAROLINE ISLANDS: Lukunur: *D. Anderson 2143* (N, W--2242705). Nukuoro: *Carroll 22* (W--2684321). Truk: *Falanruw 3510* (W--2992792). KAPINGAMARANGI ISLANDS: Touhou: *Niering 659* (W--2585252A). Werua: *Niering 596* (W--2585195A). NEW GUINEA: Territory New Guinea: *Larivita & Katik LAE.70526* (Mu); *Lewandowsky 48* (W--619629). Papua: *Brass 21928* (W--2495523). NEW GUINEAN ISLANDS: Normanby: *Brass 25548* (W--2408232). Sudest: *Brass 28095* (W--2409040). BISMARK ARCHIPELAGO: New Britain: *Isles & Croft NGF.32225* (Mu). SOLOMON ISLANDS: Guadalcanal: *J. C. Riley 52* (Mi, N, W--1861961). NEW HEBRIDES: East Pentacost:*MacDaniels 3022* (Ba). NEW CALEDONIAN ISLANDS: New Caledonia: *Baumann-Bodenheim*

5176 (N); *Deplanche 84bis* (Pd); *Guillaumin & Baumann-Bodenheim 11493* (N); *MacDaniels 2003* (Ba); *McKee 2000* (W--2187168); *J. H. Taylor 64* (Ba). FIJI ISLANDS: Vanua Levu: *A. C. Smith 6622* (N). Viti Levu: *MacDaniels 444* (Ba); *H. E. Parks 20800* (W--2192378), *20857* (W--2192388); *Wright s.n.* [Feejee Isls.] (W--74074). TONGAN ISLANDS: Nomuka: *Yuncker 15801* (W--2129462). Tongutapu: *Banks & Solander s.n.* [Friendly Islands] (W--1276792); *Yuncker 15011* (W--2129146). AUSTRALIA: New South Wales: *Boorman s.n.* [Tweed Heads] (W--915447). Queensland: *Dietrich s.n.* [prope Brisbane River] (W--205872). GREAT BARRIER REEF: East Hope: *Stoddart 4367* (W--2759491). Green: *Stoddart 4235* (W--2759917). Green Ant: *Stoddart 4322* (W--2759518). West Hope: *Stoddart 4411* (W--2744427). SAMOAN ISLANDS: Savaii: *Whistler W.1211* (W--2738403). Tau: *Whistler W.1326* (W--2728232). Tutuila: *E. H. Bryan Jr. 972* (N). Upolu: *Eames 36* (It); *Whistler W.152* (W--2746182), *W.619* (W--2738282). Island undetermined: *D. W. Garber 611* (W--1655736); *Vaupel 389* (Mu, W--2127818); *Wright s.n.* [Samoan Isls.] (W--74075). COOK ISLANDS: Rarotonga: *Parks & Parks 22573* (W--1625237); *W. R. Philipson 10362* (W--2657879). CULTIVATED: Egypt: *Mahdi s.n.* [14/4/1964] (Gz, Gz). Midway Island: *Lamoureux 2174* (W--2659714). Java: *Herb. Hort. Bot. Jav. s.n.* (Pd). LOCALITY OF COLLECTION UNDETERMINED: *Collector undesignated 34* (Le), *69* (Le). MOUNTED CLIPPINGS: Walker, Fl. Okin. South. Ryuk. 894. 1976 (W).

VITEX TRIFOLIA var. *BICOLOR* f. *ALBIFLORA* (Kuntze) Mold., Phytologia 17: 53. 1968.

Additional bibliography: Mold., Phytologia 17: 52--54. 1968; Mold., Résumé Suppl. 16: 10, 12, & 29. 1968; Mold., Fifth Summ. 1: 279, 319, 339, & 344 (1971) and 2: 712 & 930. 1971; Mold., Phytol. Mem. 2: 266, 309, 329, 334, & 595. 1980; Mold., Phytologia 48: 490. 1981.

Adduru refers to this plant as a bush, 4 m. tall, flowering from May to June. His collection exhibits a few scattered teeth on some of the leaflets. Parks calls it a strand bush.

Material has been misidentified and distributed in some herbaria as *V. negundo* L.

Additional citations: PHILIPPINE ISLANDS: Luzon: *Adduru 173* (W--898696). TONGAN ISLANDS: Eua: *H. E. Parks 16178* (W--1550489).

VITEX TRIFOLIA var. *PURPUREA* Lord

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VITEX TRIFOLIA var. *SIMPLICIFOLIA* Cham.

Additional & emended synonymy: *Vitex trifolia* var. *unifoliolata* Schau. in A. DC., Prodr. 11: 683. 1847. *Vitex trifolia* var. *ovata* (Thunb.) Mak., Bot. Mag. Tokyo 17: 92. 1903. *Vitex routendifolia* L. apud Hatta, Kubo, & Watanabe, List Med. Pl. 15, sphalm. 1952. *Vitex*

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